

WHAT IS CLAIMED IS:

1. An optical scanning apparatus in which a light beam from a light source is deflected and forms an imaging spot on a surface to be scanned,
5 said apparatus comprising:

said light source having a wavelength of 500 nm or less; and

a reflecting mirror which reflects the light beam from said light source,

10 wherein if a complex refractive index N of a metallic film contributing to a reflection characteristic of said reflecting mirror is defined as

$$N(\lambda) = n(\lambda) - ik(\lambda)$$

15 where $n, k > 0$;

$n(\lambda)$ is the real part of the complex refractive index;

$$i = \sqrt{-1};$$

20 $k(\lambda)$ is the imaginary part of the complex refractive index (exhaustion factor); and

λ is the wavelength, then the reflecting mirror satisfies a condition: $k(\lambda) > \sqrt{(-n(\lambda)^2 + 18n(\lambda) - 1)}$.

2. An optical scanning apparatus according to
25 claim 1, wherein alumina (Al_2O_3) is added on the metallic film contributing to the reflection characteristic of said reflecting mirror.

3. An optical scanning apparatus according to
claim 1, wherein a dielectric film is further
added on said reflecting mirror.

5 4. An optical scanning apparatus according to
claim 1, wherein said reflecting mirror comprises
a deflecting mirror for deflecting the light beam
from the light source to perform scanning.

10 5. An optical scanning apparatus according to
claim 4, wherein the metallic film contributing
to the reflection characteristic of said
reflecting mirror of said deflecting mirror and a
base member of said deflecting mirror are formed
15 from the same metallic material.

6. An optical scanning apparatus according to
claim 4, wherein said deflecting mirror comprises
a rotary polygon mirror.

20 7. An optical scanning apparatus according to
claim 1, wherein said reflecting mirror comprises
a bending mirror for bending the optical path of
the light beam from the light source in a
25 predetermined direction.

8. An optical scanning apparatus according to

claim 1, wherein said reflecting mirror comprises a scanning and imaging mirror having a condensing effect.

5. 9. An optical scanning apparatus according to claim 1, wherein the metallic film contributing to the reflection characteristic of said reflecting mirror comprises aluminum.

10 10. An optical scanning apparatus according to claim 1, wherein the metallic film contributing to the reflection characteristic of said reflecting mirror comprises silver.

15 11. An optical scanning apparatus according to claim 1, wherein said light source comprises a gallium nitride blue-violet semiconductor laser.

12. An optical scanning apparatus according
20 to claim 1, further comprising a scanning and imaging lens system for forming the imaging spot on the surface to be scanned with the light beam from said light source,

wherein said scanning and imaging lens system
25 has at least one plastic lens; and if the maximum and the minimum of the total ray passage distance of said plastic lens according to the deflection

angle from the optical axis is Lmax and Lmin, respectively, then Lmax - Lmin < 3•log₁₀0.93/S, and S = log₁₀(1 - 3.55 × 10⁸/λ⁴), where λ is the wavelength (nm) of the light beam.

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13. An optical scanning apparatus according to claim 1, further comprising a scanning and imaging lens system for forming the imaging spot on the surface to be scanned with the light beam
10 from said light source, said scanning and imaging lens system having at least one plastic lens, and an optical member having a spectral characteristic similar to the inverse of a wavelength characteristic of the transmittance of an optical
15 resin used for said plastic lens.

14. An image forming apparatus comprising an optical scanning apparatus according to any one of claims 1 to 13, a photosensitive member disposed
20 at a surface to be scanned of said optical scanning apparatus, a development device which develops as a toner image an electrostatic latent image formed on said photosensitive member by a beam of light moved in a scanning manner by said
25 optical scanning apparatus, a transfer device which transfers the developed toner image onto a transfer member, and a fixation device which fixes

the transferred toner image on the transfer member.

15. An image forming apparatus according to
claim 14, further comprising a printer controller
5 which converts code data input from an external
device into an image signal and inputs the image
signal to said optical scanning apparatus.

16. An optical scanning apparatus comprising
10 a deflection optical system which deflects a light
beam from a light source, and a scanning and
imaging lens system which forms an imaging spot on
a surface to be scanned with the light beam from
said deflection optical system,

15 wherein the wavelength of the light source is
500 nm or less, and

wherein said scanning and imaging lens system
has at least one plastic lens; and if the maximum
and the minimum of the total ray passage distance
20 of said plastic lens according to the deflection
angle from the optical axis is L_{max} and L_{min},
respectively, then L_{max} - L_{min} < 3•log₁₀0.93/S, and
S = log₁₀(1 - 3.55 × 10⁸/λ⁴), where λ is the
wavelength (nm) of the light beam.

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17. An optical scanning apparatus according
to claim 16, wherein a correction member for

correcting light quantity distribution nonuniformity on the surface to be scanned is provided between said deflection optical system and the surface to be scanned.

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18. An optical scanning apparatus according to claim 17, wherein said correction member comprises a reflecting mirror whose reflectance changes according to the incident angle.

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19. An optical scanning apparatus according to claim 17, wherein said correction member comprises a filter whose transmittance changes according to the distance from the optical axis.

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20. An optical scanning apparatus according to claim 17, wherein said correction member comprises an optical thin film whose transmittance changes according to the distance from the optical axis.

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21. An optical scanning apparatus according to any one of claims 16 to 20, wherein light quantity distribution nonuniformity of the light beam on the surface scanned with the light beam by said scanning and imaging lens system is 7% or less.

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22. An optical scanning apparatus comprising
a deflection optical system which deflects a light
beam from a light source, and a scanning and
imaging lens system which forms an imaging spot on
5 a surface to be scanned with the light beam from
said deflection optical system,

wherein the wavelength of the light source is
500 nm or less, and

wherein said scanning and imaging lens system
10 has at least one plastic lens, and an optical
member having a spectral characteristic similar to
the inverse of a wavelength characteristic of the
transmittance of an optical resin used for said
plastic lens.

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23. An optical scanning apparatus according
to claim 22, wherein said optical member comprises
a reflecting mirror.

20 24. An optical scanning apparatus according
to claim 22, wherein said optical member comprises
a filter.

25 25. An optical scanning apparatus according
to claim 22, wherein said optical member comprises
an optical thin film.

26. An optical scanning apparatus according to any one of claims 22 to 25, wherein said light source comprises a gallium nitride blue-violet semiconductor laser.

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27. An optical scanning apparatus according to claim 22, wherein said scanning and imaging lens system has at least one plastic lens; and if the maximum and the minimum of the total ray passage distance of said plastic lens according to the deflection angle from the optical axis is L_{max} and L_{min}, respectively, then L_{max} - L_{min} < 10 mm is satisfied.

15 28. An image forming apparatus comprising an optical scanning apparatus according to any one of claims 16 to 20, 22 to 25 or 27;

a photosensitive member disposed at a surface to be scanned of said optical scanning apparatus;

20 a development device which develops as a toner image an electrostatic latent image formed on said photosensitive member by a beam of light moved in a scanning manner by said optical scanning apparatus;

25 a transfer device which transfers the developed toner image onto a transfer member; and a fixation device which fixes the transferred

toner image on the transfer member.

29. An image forming apparatus comprising an optical scanning apparatus according to claim 21;

5 a photosensitive member disposed at a surface to be scanned of said optical scanning apparatus;

 a development device which develops as a toner image an electrostatic latent image formed on said photosensitive member by a beam of light

10 moved in a scanning manner by said optical scanning apparatus;

 a transfer device which transfers the developed toner image onto a transfer member; and

 a fixation device which fixes the transferred

15 toner image on the transfer member.

30. An image forming apparatus comprising an optical scanning apparatus according to claim 26;

20 a photosensitive member disposed at a surface to be scanned of said optical scanning apparatus;

 a development device which develops as a toner image an electrostatic latent image formed on said photosensitive member by a beam of light moved in a scanning manner by said optical

25 scanning apparatus;

 a transfer device which transfers the developed toner image onto a transfer member; and

a fixation device which fixes the transferred toner image on the transfer member.

31. An image forming apparatus according to
5 claim 28, further comprising a printer controller which converts code data input from an external device into an image signal and inputs the image signal to said optical scanning apparatus.

10 32. An image forming apparatus according to
claim 29, further comprising a printer controller which converts code data input from an external device into an image signal and inputs the image signal to said optical scanning apparatus.

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33. An image forming apparatus according to
claim 30, further comprising a printer controller which converts code data input from an external device into an image signal and inputs the image
20 signal to said optical scanning apparatus.